

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-244430

(43)Date of publication of application : 19.09.1997

(51)Int.Cl.

G03G 15/16  
G03G 15/01  
G03G 15/02  
G03G 21/10

(21)Application number : 08-050677

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(22)Date of filing : 07.03.1996

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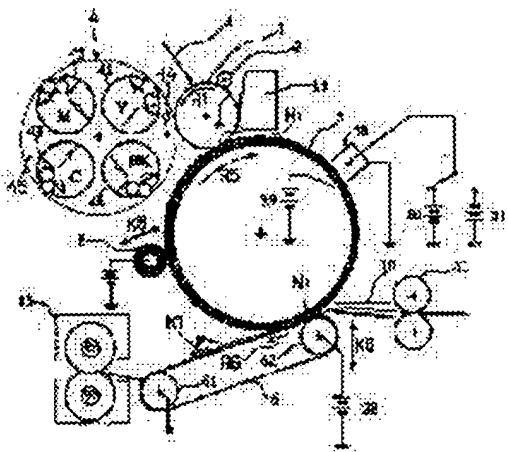
(54) IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To excellently clean an intermediate transfer body by simple constitution without reducing a throughput in a color image forming device provided with the intermediate transfer body.

SOLUTION: Toner left on the surface of the intermediate transfer body 5 after a secondary transfer action because it is not secondarily transferred on a transfer material P when a toner image is secondarily transferred is electrostatically charged to reverse polarity to the surface potential of a photosensitive drum 1 by a cleaning roller for an intermediate transfer body 8 and moved to the surface of the drum 1 from the transfer body 5 at a primary transfer nip N1. At this time, the toner image on the surface of the drum 1 can be transferred on the surface of the transfer body 5 through the nip N, at the same time.

That means, the transfer body 5 is cleaned by moving the toner left after the secondary transfer action to the surface of the drum 1 from the surface of the transfer body 5 at the same time that the toner image is primarily transferred on the surface of the transfer body 5 from the surface of the drum 1 through the nip N1.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

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CLAIMS

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[Claim(s)]

[Claim 1] While contacting the 2nd movable image support front face on the 1st movable image support front face and forming primary imprint nip in it Carry out opposite arrangement of the secondary imprint member, and a secondary imprint location is established in said 2nd image support front face. The primary toner image formed in said 1st image support front face one by one is imprinted one by one on said 2nd image support front face through said primary imprint nip. In the image formation equipment which bundles up two or more toner images imprinted by the 2nd image support front face [ primary ] to the 3rd image support by said secondary imprint member, and imprints them the 2nd order in said secondary imprint location this -- About the migration direction of a charge grant means to give a charge to the toner image before said secondary imprint, and said 2nd image support front face It has the electrification means which is the downstream of said secondary imprint location, and has been arranged to the upstream of said primary imprint nip. While electrifying said the 1st surface potential and reversed polarity of image support, the secondary transfer residual toner by which this electrification means remained in said 2nd image support front face, without said 3rd image support imprinting in said secondary imprint location this -- the image formation equipment characterized by what the secondary transfer residual toner of the reversed polarity on the 2nd image support is returned for to said 1st image support front face through said primary imprint, simultaneously said primary imprint nip.

[Claim 2] Image formation equipment according to claim 1 characterized by what is been the roller member to which said electrification means is arranged free [ attachment and detachment ] to said 2nd image support front face, and bias is impressed.

[Claim 3] Image formation equipment according to claim 1 or 2 characterized by what opposite arrangement is carried out and said charge grant means gives a charge to the upstream of said primary imprint nip about the migration direction of said 1st image support front face for to the toner image before said primary imprint on said 1st image support front face.

[Claim 4] Image formation equipment according to claim 1 or 2 characterized by what it is the downstream of said primary imprint nip about the migration direction of said 2nd image support front face, and opposite arrangement is carried out and said charge grant means gives a charge to the upstream of said secondary imprint location for to the toner image before said secondary imprint on said 2nd image support front face.

[Claim 5] Image formation equipment of claim 1 characterized by what the toner image formed one by one on said 1st image support contains for the toner image formed with a magnetic toner, and the toner image formed with a nonmagnetic toner thru/or claim 4 given in any 1 term.

[Claim 6] Image formation equipment of claim 1 characterized by what is charged in said the 1st surface potential and reversed polarity of image support in the toner image and transfer residual toner on said 2nd image support with said electrification means at the time of pre-rotation of image formation equipment and the recovery action after jam processing thru/or claim 5 given in any 1 term.

[Claim 7] Image formation equipment of claim 1 to which said 1st image support is characterized by what is been an electrophotography photo conductor thru/or claim 6 given in any 1 term.

[Claim 8] Image formation equipment of claim 1 to which said 1st image support is characterized by what is been an electrostatic recording dielectric thru/or claim 6 given in any 1 term.

[Claim 9] Image formation equipment of claim 1 to which said 1st image support is characterized by what is been the magnetic-recording magnetic substance thru/or claim 6 given in any 1 term.

[Claim 10] Image formation equipment of claim 1 characterized by what said 2nd image support is a middle imprint object of the shape of a drum supported free [ rotation ] thru/or claim 9 given in any 1 term.

[Claim 11] Image formation equipment of claim 1 characterized by what said 2nd image support is a middle imprint object of the shape of a belt supported free [ the circumference ] thru/or claim 9 given in any 1 term.

[Claim 12] Image formation equipment of claim 1 to which said 3rd image support is characterized by what is been sheet-like imprint material thru/or claim 11 given in any 1 term.

[Claim 13] Image formation equipment of claim 12 characterized by what is done for pinching conveyance of said imprint material in this secondary imprint nip while said secondary imprint member is a contact imprint member by which contact arrangement was carried out on said 2nd image support front face and forms secondary imprint nip in said secondary imprint location given in any 1 term.

[Claim 14] the downstream of said primary imprint nip about the migration direction of said 1st image support -- this -- the image formation equipment of claim 1 characterized by what it has for cleaning equipment from which the transfer residual toner of the 1st image support front face is removed thru/or claim 13 given in any 1 term.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image formation equipment of the method which bundles up two or more toner images on the image support of these 2nd, and is imprinted on imprint material, after imprinting the primary toner image formed one by one on the 1st image support one by one on the 2nd image support.

[0002]

[Description of the Prior Art] Conventionally, what uses a middle imprint object is known in image formation equipments, such as a copying machine and a laser beam printer.

[0003] This thing forms [ next ] the toner image of two or more colors on a middle imprint object by repeating primary imprint processes which imprint the toner image (good transfer picture) formed in the photoconductor drum (1st image support) front face on a middle imprint object (2nd image support) about the toner image of two or more colors. A color picture (multi-colored picture image) is formed on imprint material by putting in block the toner image of two or more colors on these middle imprint object on imprint material, such as paper, and imprinting it the 2nd order.

[0004] In the image formation equipment using an above-mentioned middle imprint object, it has the advantage that an image without superposition gap (color gap) of the toner image of each color can be obtained. On the other hand, after secondary imprinting from a middle imprint object to imprint material, a transfer residual toner (secondary transfer residual toner) exists on a middle imprint object, and removal of this transfer residual toner has been one technical technical problem.

[0005] As this The means for solving a technical problem, contact alienation of the cleaning blade which becomes a middle imprint object from an elastic body in for example, \*\* JP,56-153357,A and JP,5-303310,A is carried out, and the technique which scratches the transfer residual toner on a middle imprint object is indicated.

\*\* The fur brush which carries out contact alienation is formed in a middle imprint object again, the secondary transfer residual toner on a middle imprint object and the bias of reversed polarity are impressed, transfer residual toners are collected, and after making it once adhere to bias rollers, such as a metal roller, the thing of the configuration of \*\*\*\*\* is also known for the blade in this.

\*\* The approach of electrifying the transfer residual toner on a middle imprint object in the potential and reversed polarity on a photo conductor, and returning by electric field on a photo conductor is further proposed as an auxiliary means which makes the load of blade cleaning mitigate in JP,4-340564,A and JP,5-297739,A.

\*\* In addition, in JP,1-105980,A, the electrification machine which electrifies the transfer residual toner on a middle imprint object in the electrification potential and reversed polarity of a photo conductor for the useless exclusion which forms the same cleaning equipment as the both sides of a middle imprint object and a photo conductor, and simplification of a cleaning equipment configuration is formed, and the configuration which returns the transfer residual toner on a middle imprint object to a photo conductor only with this electrification vessel is proposed. According to the publication of this proposal, the stroke of electrification of the transfer residual toner on a middle imprint object and an imprint is being able to change a middle imprint object into a cleaner condition by carrying out two or more times, although what is necessary is just to carry out once into 1 time (one sheet) of a copy process.

[0006]

[Problem(s) to be Solved by the Invention] However, there were the respectively following troubles in the cleaning equipment of a middle imprint object of above-mentioned \*\* - \*\*.

\*\* In case the cleaning blade contacted for cleaning estranges from a middle imprint object, in order that the toner which was \*\*\*\*(ing) to the cleaning blade may remain on a middle imprint object, the problem of generating the remains of a blade on the image of the following print process arises. Moreover, since a cleaning blade and the surface of the middle imprint object with which this has contacted are worn out by prolonged use, the title between generating of poor cleaning, decline in the imprint effectiveness by degradation of the surface of a middle imprint object, etc. is also produced.

\*\* Since cleaning equipment becomes complicated and large-sized, the thing using a fur brush has the fault of causing enlargement and the cost quantity of the whole image formation equipment again.

\*\* There is a fault that the thing using for example, a corona-electrical-charging machine and a bias roller as an auxiliary means reduces remarkably further the throughput at the time of the continuation print of a pattern which the step for cleaning a middle imprint object apart from the usual print step although it is effective is needed, and is different to wear or enlargement since it differs from the cleaning approach by mechanical rubbing like \*\* and \*\*.

\*\* In addition, the thing which forms the electrification machine of a publication in JP,1-105980,A While the configuration is a very simple and effective means, by the above-mentioned proposal 1 time (one sheet) of a print step - the cleaning step of 1 time or multiple times -- carrying out (sequential cleaning) -- only by there being a publication to say Reference is not made about the approach of cleaning a middle imprint object to a sequence, i.e., a primary imprint and coincidence, in case the continuation print of a different pattern is performed. Therefore, since sequential cleaning is performed also in this proposal, the fall of a throughput will arise at the time of the continuation print of a different pattern.

[0007] Then, this invention aims at offering the image formation equipment which enabled it to perform cleaning of the 2nd image support (middle imprint object), without moreover causing the fall of a throughput with an easy configuration.

[0008]

[Means for Solving the Problem] While this invention concerning claim 1 contacts the 2nd movable image support front face on the 1st movable image support front face and forms primary imprint nip in it Carry out opposite arrangement of the secondary imprint member, and a secondary imprint location is established in said 2nd image support front face. The primary toner image formed in said 1st image support front face one by one is imprinted one by one on said 2nd image support front face through said primary imprint nip. In the image formation equipment which bundles up two or more toner images imprinted by the 2nd image support front face [ primary ] to the 3rd image support by said secondary imprint member, and imprints them the 2nd order in said secondary imprint location this -- About the migration direction of a charge grant means to give a charge to the toner image before said secondary imprint, and said 2nd image support front face It has the electrification means which is the downstream of said secondary imprint location, and has been arranged to the upstream of said primary imprint nip. While electrifying said the 1st surface potential and reversed polarity of image support, the secondary transfer residual toner by which this electrification means remained in said 2nd image support front face, without said 3rd image support imprinting in said secondary imprint location this -- it is characterized by what the secondary transfer residual toner of the reversed polarity on the 2nd image support is returned for to said 1st image support front face through said primary imprint, simultaneously said primary imprint nip.

[0009] Said electrification means is arranged free [ attachment and detachment ] to said 2nd image support front face, and this invention concerning claim 2 is characterized by what is been the roller member to which bias is impressed.

[0010] It is characterized by what opposite arrangement of said charge grant means is carried out at the upstream of said primary imprint nip about the migration direction of said 1st image support front face, and this invention concerning claim 3 gives a charge for to the toner image before said primary imprint on said 1st image support front face.

[0011] This invention concerning claim 4 is characterized by what said charge grant means is the downstream of said primary imprint nip about the migration direction of said 2nd image support front face, and opposite arrangement is carried out at the upstream of said secondary imprint location, and a charge is given for to the toner image before said secondary imprint on said 2nd image support front face.

[0012] This invention concerning claim 5 is characterized by what the toner image formed one by one on said 1st image support contains for the toner image formed with a magnetic toner, and the toner image formed with a nonmagnetic toner.

[0013] This invention concerning claim 6 is characterized by what is charged in said the 1st surface potential and reversed polarity of image support in the toner image and transfer residual toner on said 2nd image support with said electrification means at the time of pre-rotation of image formation equipment and the recovery action after jam processing.

[0014] This invention concerning claim 7 is characterized by what said 1st image support is an electrophotography photo conductor.

[0015] This invention concerning claim 8 is characterized by what said 1st image support is an electrostatic recording dielectric.

[0016] This invention concerning claim 9 is characterized by what said 1st image support is the magnetic-recording magnetic substance.

[0017] This invention concerning claim 10 is characterized by what said 2nd image support is a middle imprint object of the shape of a drum supported free [ rotation ].

[0018] This invention concerning claim 11 is characterized by what said 2nd image support is a middle imprint object of the shape of a belt supported free [ the circumference ].

[0019] This invention concerning claim 12 is characterized by what said 3rd image support is sheet-like imprint material.

[0020] Said secondary imprint member is a contact imprint member by which contact arrangement was carried out on said 2nd image support front face, and this invention concerning claim 13 is characterized by what is done for pinching conveyance of said imprint material in this secondary imprint nip while it forms secondary imprint nip in said secondary imprint location.

[0021] this invention concerning claim 14 -- the downstream of said primary imprint nip about the migration direction of said 1st image support -- this -- it is characterized by what it has for cleaning equipment from which the transfer residual toner of the 1st image support front face is removed.

[0022] [Operation] Since the secondary transfer residual toner of the 2nd image support front face is charged in the 1st surface potential and reversed polarity of image support with the electrification means, it moves to the 1st image support front face from the 2nd image support front face in primary imprint nip. At this time, the toner image of the 1st image support front face is imprinted on the 2nd image support front face through the same primary imprint nip by coincidence. That is, a secondary transfer residual toner moves to the 1st image support front face from the 2nd image support front face on the contrary through primary imprint nip at that the primary toner image is imprinted by the 2nd image support front face from the 1st image support front face, and coincidence. Therefore, in order to remove a secondary transfer residual toner, excessive time amount is not spent.

[0023]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained along with a drawing. <Gestalt 1 of operation> Drawing 1 is the outline sectional view using an electrophotography process of color picture formation equipments, such as a copying machine and a laser beam printer. the elastic roller of low \*\* [ inside ] as a middle imprint object (2nd image support) 5 in the color picture formation equipment shown in this drawing -- moreover, the imprint belt 6 is used as a secondary contact imprint means (secondary imprint member).

[0024] Color picture formation equipment is equipped with the electrophotography photo conductor (henceforth a "photoconductor drum") 1 of a drum type as 1st image support. While a photoconductor drum 1 is grounded, the rotation drive of it is carried out by the driving means (un-illustrating) with a predetermined peripheral velocity (process speed) in the arrow-head R1 direction.

[0025] A photoconductor drum 1 is a rotation process. With the primary electrification roller 2 A predetermined polarity, Electrification processing is carried out at Mr. - at predetermined potential, and, subsequently it is an image exposure means (color separation a color copy image) by which it does not illustrate. Image formation exposure optical system, The electrostatic latent image corresponding to the 1st color component image (for example, yellow component image) of the target color picture is formed by receiving the image exposure 3 by the scan exposure system by the laser scanner which outputs the laser beam modulated corresponding to the time series electrical-and-electric-equipment digital pixel signal of image information etc.

[0026] Subsequently, the electrostatic latent image is developed with the yellow toner Y which is the 1st color charged in an electrostatic latent image and reversed polarity with the 1st development counter 41 (yellow development counter) of a developer 4. Four development counters 41, i.e., the 1st development counter, the 2nd development

counter (Magenta development counter) 42 which contained the Magenta toner M, the 3rd development counter (cyanogen development counter) 43 which contained the cyanogen toner C, and the 4th development counter (black development counter) which contained the black toner BK. It is carried in the pivotable body of revolution 45, and the predetermined development counter with which this body of revolution 45 is offered in the arrow-head R4 direction by development in connection with a rotation drive being carried out by the driving means (un-illustrating) is arranged in a photoconductor drum 1 and the development location which counters.

[0027] As mentioned above, the middle imprint object 5 is constituted by the elastic roller of inside resistance, and contact arrangement is carried out on photoconductor drum 1 front face, and it constitutes the primary imprint nip N1 between photoconductor drums 1. The rotation drive is carried out by the driving means (un-illustrating) in the arrow-head R5 direction, and the middle imprint object 5 is the primary imprint nip N1. It sets and moves with the peripheral velocity as this direction with same photoconductor drum 1 front face and middle imprint object 5 front face.

[0028] The yellow toner image of the 1st above-mentioned color by which formation support was carried out on the photoconductor drum 1 is the primary imprint nip N1. In the process to pass, the middle imprint is carried out on middle imprint object 5 front face (peripheral face) by the pressure which acts between a photoconductor drum 1 and the middle imprint object 5, and the electric field formed of the primary imprint bias impressed to the middle imprint object 5 by the source 29 of primary imprint bias. Hereafter, this process is called primary imprint.

[0029] Hereafter, the superposition imprint of the Magenta toner image of the 2nd color, the cyanogen toner image of the 3rd color, and the black toner image of the 4th color is similarly carried out on the middle imprint object 5 one by one, and the synthetic color toner image corresponding to the target color picture is formed.

[0030] Under the middle imprint object 5, the imprint belt (secondary imprint member) 6 is arranged. The bias roller 62 and tension roller 61 which were arranged in the shaft of the middle imprint object 5 and parallel are built in the shape of endless, it is contacted by middle imprint object 5 front face from a lower part, and the imprint belt 6 is the secondary imprint nip (secondary imprint location) N2 between the middle imprint objects 5. It forms. Circumference migration of the imprint belt 6 is carried out in the arrow-head R6 direction with rotation of a tension roller 61. Desired secondary imprint bias is impressed to the bias roller 62 by the source 28 of secondary imprint bias, and the tension roller 61 is grounded.

[0031] The primary imprint bias for the sequential superposition imprint of the black toner image of the 4th color is impressed with a toner by the source 29 of primary imprint bias with reversed polarity (it sets in the gestalt of this operation and is straight polarity) from the yellow toner image of the 1st color from the photoconductor drum 1 to the middle imprint object 5.

[0032] The above-mentioned imprint belt 6 and the below-mentioned middle imprint object cleaning roller (electrification means) 8 are arranged free [ attachment and detachment ] in arrow-head K6 direction and the arrow-head K8 direction, respectively, and attach and detach to predetermined timing like the after-mentioned in the sequential imprint activation process of the toner image of the 1st color to the 4th color from the photoconductor drum 1 to the middle imprint object 5 on middle imprint object 5 front face.

[0033] The synthetic color toner image by which the superposition imprint was carried out on the middle imprint object 5. The imprint to the imprint material (3rd image support) P, such as paper, is preceded, and it is the primary imprint nip N1 about the hand of cut of the middle imprint object 5. It is the downstream and is the secondary imprint nip N2. Upstream, That is, primary imprint nip N1 Secondary imprint nip N2 With the electrification vessels 18 before a secondary imprint (corotron as an electrification means, scorotron, etc.) arranged in between, it comes to have higher TORIBO in response to electrification with the electrostatic latent image of a photoconductor drum 1 still stronger against reversed polarity. In addition, measurement of TORIBO is performed using a faraday gage.

[0034] The imprint to the imprint material P of the synthetic color toner image by which the superposition imprint was carried out on the middle imprint object 5 while the imprint belt 6 is contacted by the middle imprint object 5 -- the resist roller 11 from a non-illustrated sheet paper cassette, and the guide 10 before an imprint -- passing -- secondary imprint nip N2 between the middle imprint object 5 and the imprint belt 6. It is fed with the imprint material P to predetermined timing. Secondary imprint bias to coincidence. It is carried out by being impressed by the bias roller 62 from the source 28 of secondary imprint bias. A synthetic color toner image is imprinted by this secondary imprint bias from the middle imprint object 5 to the imprint material P. This process is called secondary imprint below.

[0035] The imprint material P which received the secondary imprint of a toner image is introduced to a fixing assembly 15, heating pressurization is carried out here, and it is fixed to a surface toner image.



[0036] After secondary imprint termination of the toner image to the imprint material P, the middle imprint object cleaner roller 8 is contacted, and the transfer residual toner on the middle imprint object 5 is cleaned.

[0037] Next, the middle imprint object cleaning means which is the description of this invention is explained below.

[0038] It is the description that the middle imprint object cleaning means of this invention imprints and returns the secondary transfer residual toner on the middle imprint object 5 to the primary imprint and coincidence from the photoconductor drum 1 to the middle imprint object 5 at a photoconductor drum 1.

[0039] The mechanism is explained. As for a secondary transfer residual toner, in case a toner is imprinted by the imprint material P with the imprint belt 6 from the middle imprint object 5, a toner has many toners which were charged in reversed polarity (the gestalt of this operation straight polarity) with the electrification polarity (the gestalt of this operation negative polarity) of normal in response to electric field with strong reversed polarity, and remain on the middle imprint object 5. However, the toner in which it is not reversed to straight polarity, it is neutralized partially, and no toners have a charge, and the toner which is maintaining negative polarity also exist.

[0040] This phenomenon was checked by conducting the experiment described below.

[0041] With the image formation equipment of a configuration of being shown in drawing 1, the two-sheet continuation print of a monochrome text pattern and a solid white pattern is carried out. When there is no middle imprint object cleaning means, in the solid white pattern of the 2nd sheet, the transfer residual toner of the monochrome text pattern of a pre-print appears like POJIGOSUTO. When the secondary imprint bias value was changed at this time and the generating level of POJIGOSUTO was observed, it was observed that the level of POJIGOSUTO generated in imprint bias with extent of generating of generated POJIGOSUTO higher than the imprint bias which changes with secondary imprint bias values and shows the greatest imprint effectiveness is improved most.

[0042] Conventionally, it is known that imprint effectiveness will have a peak with a certain imprint bias value, and imprint effectiveness will fall superfluous bias by impression.

[0043] Since the behavior of POJIGOSUTO generating by the above-mentioned examination differed from the behavior of the conventional imprint effectiveness, the toner on the middle imprint object 5 after a secondary imprint and a photoconductor drum 1 was observed. Although there were very many toners on the middle imprint object 5 when it imprinted by superfluous secondary imprint bias, the toner existed in coincidence also on the photoconductor drum 1, and it was checked that the secondary transfer residual toner on the middle imprint object 5 was imprinted by the photoconductor drum 1, and has returned from the appearance of the pattern of those toners clearly.

[0044] Taking the behavior of reversing a secondary transfer residual toner to reversed polarity by strong secondary imprint bias at the time of an imprint was checked from the above examination result.

[0045] However, since the neutralized toner and the toner which is maintaining negative polarity also exist as mentioned above, the secondary transfer residual toner on the middle imprint object 5 does not return to a photoconductor drum 1 completely, but appears as POJIGOSUTO in a print [ degree ] image at the time of a continuation print. Moreover, if imprint bias higher than the optimal imprint bias is used, since image degradation by the imprint overcurrent becomes intense, it cannot become practical use.

[0046] Then, these people decided to establish an electrification means to make reversed polarity also reverse the toner which is neutralized among the secondary transfer residual toners on the middle imprint object 5, and does not have a charge, and the toner which is maintaining negative polarity, after a secondary imprint.

[0047] Consequently, these people checked that it became possible to return all the secondary transfer residual toners to a photoconductor drum 1.

[0048] Moreover, since each other is not offset in short-time contact, each other charge of the normal toner on the reverse-charged toner and photoconductor drum 1 on the middle imprint object 5 imprinted the 1st order is the primary imprint nip N1 of a photoconductor drum 1 and the middle imprint object 5. It turned out that the toner in which the reverse-charged toner is carrying out normal electrification on the other hand to the photoconductor drum 1 is imprinted to the middle imprint object 5, respectively.

[0049] That such a thing happens by making primary imprint bias low Primary imprint nip N1 The electric field built between a photoconductor drum 1 and the middle imprint object 5 are weakened, and it is the primary imprint nip N1. By controlling toner electrification by discharge When the primary imprint nip pass time of a toner is short, in order that the phase bactericidal action of a charge may not work, the toner on a photoconductor drum 1 and the toner on the middle imprint object 5 are for taking the behavior which became independent, respectively.

[0050] Moreover, by the electrostatic latent image of a photoconductor drum 1 being still stronger to reversed polarity,

and the synthetic color toner image by which the superposition imprint was carried out on the middle imprint object 5 being charged with the electrification vessel 18 before a secondary imprint, by the source 31 of bias in advance of the imprint to the imprint material P, a toner comes to have higher TORIBO and its secondary imprint nature improves.

[0051] In the gestalt of this operation, the electrification means of a contact mold and the elastic roller which specifically has two or more layers were used as a middle imprint object cleaning roller 8 as an electrification means of the secondary transfer residual toner on the middle imprint object 5.

[0052] The outline sectional view of the middle imprint object cleaning roller 8 actually used for drawing 2 by this invention is shown.

[0053] The middle imprint object cleaning roller 8 used with the gestalt of this operation is the thing of the roller geometry which has the elastic layer 82 which consists of rubber, an elastomer, and resin at least on the conductive cylinder-like base material 83, and the roller geometry which has the above enveloping layer 81 further in the upper layer of the elastic layer 82.

[0054] The conductive resin which distributed metals and alloys, such as aluminum, iron, copper, and stainless steel, a carbon metallurgy group particle, etc. can be used for the conductive cylinder-like base material 83 with rigidity from which nip width of face becomes equal at a longitudinal direction that what is necessary is just the quality of the material which can contact, without bending, when the elastic layer 82 is made to contact the middle imprint object 5 through an enveloping layer 81.

[0055] The elastic layer 82 should just fulfill having a certain amount of electric pressure-proofing etc. to having the degree of hardness which can contact the middle imprint object 5 without a clearance, and the bias impressed.

[0056] As the concrete rubber quality of the material, acrylonitrile-butadiene rubber (NBR), styrene butadiene rubber, butadiene rubber, ethylene propylene rubber, chloroprene rubber, chlorosulfonated polyethylene, chlorinated polyethylene, acrylonitrile-butadiene rubber, acrylic rubber, a fluororubber, polyurethane rubber, etc. are mentioned. As resistance, 107 - 1011 ohm-cm (at the time of 1kV impression) is desirable at a volume resistivity. About the resistance for which the middle imprint object cleaning roller 8 is asked, it mentions later.

[0057] The quality of the material of an enveloping layer 81 serves as an important factor, when realizing middle imprint object cleaning. That is because the function for which the middle imprint object cleaning roller 8 is asked is the same as that of the electrification roller charged in photoconductor drum 1 front face.

[0058] When resistance of the electrification roller charged in photoconductor drum 1 front face is very stable and there is no surface microscopic resistance nonuniformity, it can be satisfied also with the roller of a monolayer configuration of a function. The electrostatic capacity which depends this on the discharge which electrification produces where an electrical potential difference is impressed between the quality of photoconductor drum 1 facing and the electrification roller quality of the material, and contributes to discharge is because it is decided by resistance.

[0059] Therefore, also in order to stop the microscopic resistance nonuniformity of rheostatic control and a front face, expansion of ingredient alternative, the cost of performing functional separation of each class by considering an electrification roller as a two-layer configuration, and making the lower layer elastic layer 82 bear the function of fine tuning of resistance for rough resistance control to the surface enveloping layer 81 again, etc. are desirable also from the field on manufacture.

[0060] Although the two-layer configuration is taken in the gestalt of this operation from an above-mentioned viewpoint, what Nylon, urethane resin, a fluororesin, etc. were made to distribute metallic oxides, such as titanium oxide and tin oxide, as electric conduction material, and carried out rheostatic control to them as the quality of the material used for an enveloping layer 81 is desirable.

[0061] Moreover, it is good also as a type which twists the resin of the shape of the shape of a sheet, and a tube as an enveloping layer 81.

[0062] Resistance of an enveloping layer 81 needs to have sufficient surface electrical resistance, in order to discharge in contact with the middle imprint object 5. As the value, 106-1015ohm and cm2 (at the time of 1kV impression) are effective.

[0063] In measurement of surface electrical resistance, the sample which applied the enveloping layer is made from the same conditions, R8340made from Advantest A and R12704 are used for the conductive liner sheet whose every direction is 100x100mm at it, and they are the applied voltage of 1kV, and discharge. 5sec, charge 30sec and measure The value measured on condition that 30sec was calculated.

[0064] The configuration of the middle imprint object cleaning roller 8 used with the gestalt of this operation is NBR

with a thickness of 3mm and a volume resistivity 109 as an elastic layer 82 on 14mm outer-diameter phi rodding 83 made from stainless steel. Omega-cm (at the time of 1kV impression) was constituted, and the thing which made the N-methoxymethylated polyamide which is Nylon distribute titanium oxide as an enveloping layer 81 was used. the thickness -- 30 micrometers and a surface-electrical-resistance value -- 108 Omega-cm<sup>2</sup> it is . An outer diameter is abbreviation phi20mm.

[0065] By the approach shown in drawing 3 , real use resistance of the above-mentioned middle imprint object cleaning roller 8 was measured. The real use resistance said here is resistance as a middle imprint object cleaning roller 8 including an elastic layer and an enveloping layer.

[0066] In drawing 3 , the middle imprint object cleaning roller 8 by which the rotation drive was carried out in the arrow-head R71 direction, and contact arrangement of the aluminum cylinder 71 was carried out with the rotation driver (un-illustrating) at this carries out follower rotation. The contact pressure at this time supposes that it is equivalent to a system busy condition, and is total pressure 1kgf. The fixed direct current voltage Vdc is impressed to the rodding 83 of the middle imprint object cleaning roller 8 by the high voltage power supply 73. The current which passes the elastic layer of the middle imprint object cleaning roller 8 and an enveloping layer, and flows flows into the aluminum cylinder 71, and is grounded through standard resistance 72. It is Vr about the electrical potential difference of the both ends of standard resistance 72. If [V], it is the resistance Rc of the middle imprint object cleaning roller 8. It is given by the degree type.

[0067]  $R_c [\text{ohm}] = 106 / V_r [V]$

Real use resistance of the middle imprint object cleaning roller 8 was 4x108ohms as a result of the measurement.

[0068] The real use resistance which the middle imprint object cleaning roller 8 is expected according to examination of these people is 5x105 to 1x109 with an above-mentioned measuring method. It turned out in the range of omega that it is usable.

[0069] Moreover, it checked that effectiveness had the thickness of an enveloping layer 81 by 5-100 micrometers.

[0070] Next, with reference to drawing 4 , the middle imprint object 5 used with the gestalt of this operation is explained.

[0071] It is the thing of the roller geometry which has the elastic layer to which the middle imprint object 5 used for the gestalt of this operation also consists of rubber, an elastomer, resin, etc. at least on a conductive cylinder-like base material, and the roller geometry which has the above enveloping layer further in the upper layer of the elastic layer.

[0072] Drawing 4 is the outline sectional view of the middle imprint object 5, and, as for the conductive base material with which 53 formed the rigid body in the shape of a cylinder, and 52, an elastic layer and 51 are surfaces.

[0073] As a conductive base material 53, the conductive resin which distributed metals and alloys, such as aluminum, iron, copper, and stainless steel, a carbon metallurgy group particle, etc. should be used, and it should reinforce inside what penetrated the shaft as the configuration at the shape of a cylinder which was mentioned above, and the cylindrical core, and a cylinder. The rodding 53 used with the gestalt of this operation reinforces inside the cylinder of aluminum with a thickness of 3mm.

[0074] The thickness of the elastic layer 52 used for the middle imprint object 5 is the predetermined primary imprint nip N1. Secondary imprint nip N2 From fields, like forming, that there is no color gap by rotation of the middle imprint object 5, and ingredient cost is cheap, 0.5-7mm was desirable and could be 5mm in the gestalt of this operation. Moreover, even when the lower layer elastic layer 52 was covered, as for the thickness of a surface 51, it was desirable to have made it extent on which the flexibility of the elastic layer 52 acts effectively in surface 51 front face at a thin layer, and 50-200 micrometers was desirable and specifically set it to about 50 micrometers in the gestalt of this operation. The outer diameter as the whole middle imprint object 5 is phi80mm.

[0075] Moreover, the elastic layer 52 used what thought only resistance as important, and acrylonitrile-butadiene rubber (NBR) was made to distribute KETCHIEN black as electric conduction material, and controlled the volume resistivity.

[0076] In addition, as the rubber quality of the material of the elastic layer 52 which can be used, the same quality of the material as the elastic layer 82 of previous middle imprint object cleaning roller 8 grade is mentioned.

[0077] Moreover, as electric conduction material for volume low effectiveness adjustment, carbon black, an aluminium powder, nickel powder, etc. can be used, for example. Moreover, resin is not made to distribute an electric conduction agent, but using conductive resin is also considered. Specifically, a quarternary-ammonium-salt content polymethyl methacrylate, a polyvinyl aniline, a polyvinyl pyrrole, the poly diacetylene, polyethyleneimine, etc. are mentioned.

[0078] Thickness starts the above-mentioned elastic layer 52 in the shape of [ proper ] a sheet by every direction 100x100mm, R8340 made from Advantest A and R12704 are used, and measurement of a volume resistivity is the applied voltage of 1kV, and discharge. 5sec, charge 30sec and measure It carried out on condition that 30sec.

[0079] Since the cleaning nature of a secondary transfer residual toner is influenced greatly, the surface 51 of the middle imprint object 5 is important. The thing which made the binder distribute [ urethane resin ] PTFE powder for a way acid aluminum whisker for the purpose of a mold release disposition top as electric conduction material of rheostatic control again, respectively was used for the surface 51.

[0080] the place which measured the surface electrical resistance of the surface 51 by the same measuring method as \*\*\*\* -- 1010 ohm-cm 2 it was . According to examination of these people, surface electrical resistance is 108 - 1010 ohm-cm 2. When it was in within the limits, it turned out that the good cleaning engine performance is securable.

[0081] The real use resistance containing the elastic layer 52 and a surface 51 is 107. It was omega (at the time of 1kv impression). The measuring method of real use resistance of the middle imprint object 5 was also performed by the technique same like the case of the above-mentioned middle imprint object cleaning roller 8 as the system of measurement shown in drawing 3 .

[0082] Next, the toner used with the gestalt of this operation is explained.

[0083] As a developer, the shape factor SF 1 (after-mentioned) uses the diameter polymerization toner of a nonmagnetic 1 component particle which is the substantial globular form about 116 and whose mean particle diameter with which the shape factor SF 2 (after-mentioned) was manufactured by the suspension-polymerization method of about 109 are 7 micrometers, including the low softening temperature matter five to 30% of the weight.

[0084] Generally, if the configuration of a toner approaches a globular form infinite, it is said that imprint effectiveness becomes high. The surface energy of each toner becomes small, a fluidity increases, the adsorption power (reflection force) over a photoconductor drum 1 etc. becomes weaker, and this is considered to be because it to become easy to be influenced of imprint electric field.

[0085] The outline configuration of an above-mentioned polymerization toner is shown in drawing 5 .

[0086] As shown in this drawing, the polymerization toner 9 serves as the manufacturing method top globular form. With the gestalt of this operation, the endocyst of the ester system wax was carried out to the core 93, and the polymerization toner of a configuration of telling styrene butyl acrylate to the resin layer 92, and telling styrene polyester to a surface 91 was used. The specific gravity is about 1.05. Thus, the reason used as 3 lamination of a core 93, the resin layer 92, and a surface 91 is carrying out the endocyst of the wax to a core 93, and since the rise of electrification effectiveness is aimed at by acquiring the offset prevention effectiveness in a fixing process, and forming a surface 91 in the resin layer 92, it is actually \*(ing) the silica which carried out oil processing for TORIBO stabilization outside at the time of use.

[0087] In addition, it is the numeric value which indicates the rate of the roundness of the configuration of the spherical matter to be the shape factor SF 1 here as shown in drawing 6 , the square of the maximum length MXLNG of the ellipse-like graphic form which projects the spherical matter on a two-dimensional flat surface, and can do it is broken by the graphic form area AREA, and it is expressed with the value when multiplying by 100pi/4. That is, a shape factor SF 1 is degree type and  $SF=[1] \{(MXLNG)^2 / AREA\} \times (100\pi/4)$ .

It comes out and defines.

[0088] On the other hand, as shown in drawing 7 , a shape factor SF 2 is a numeric value which shows the rate of the irregularity of the configuration of the matter, breaks by the graphic form area AREA the perimeter PERI of the graphic form which projects the matter on a two-dimensional flat surface, and can do it, and is expressed with the value when multiplying by 100pi/4. That is, a shape factor SF 2 is degree type and  $SF=[2] \{(PERI)^2 / AREA\} \times (100\pi/4)$ .

It comes out and defines.

[0089] each should boil the shape factors SF1 and SF2 mentioned to the gestalt of this operation Hitachi FE-SEM (S-800) -- a RITONA image is sampled to random 100 times, and it analyzes by introducing the image information into the image-analysis equipment made from NIKORE (LUSEX3) through an interface, and computes from an upper type.

[0090] TORIBO on the photoconductor drum 1 before the primary imprint of the above-mentioned toner used with the gestalt of this operation is [ about ]. -20micro was C/g.

[0091] Next, the photoconductor drum 1 used with the gestalt of this operation prepares OPC (organic light photoconductor) as a sensitization layer on a cylinder-like drum base, and forms it in outer-diameter phi60mm. Using a 0.2-0.3-micrometer phthalocyanine compound as a charge generating layer (Carrier Generation Layer), as a charge

transportation layer (Carrier Transfer Layer) of the upper layer, OPC distributed the hydrazone compound in the polycarbonate of a binder, and what set thickness to 15-25 micrometers was used for it.

[0092] With the gestalt of this operation, as shown in drawing 1, the imprint belt 6 is used as secondary imprint means. The thing of the quality of the material from which the thing of the same quality of the material also differs is sufficient as the bias roller 62 and tension roller 61 which are supporting the imprint belt 6. At the gestalt of this operation, it is a volume resistivity  $5 \times 10^7$  NBR of ohm-cm (at the time of 1kV impression) was used. A degree of hardness is 30 - 35 degrees in JIS-A. The bias roller 62 and the tension roller 61 were constituted so that NBR might be prepared in the shape of a cylinder on  $\phi 8$ mm SUS rodding and it might be set to outer-diameter  $\phi 20$ mm. As the quality of the material of both the above-mentioned rollers 62 and 61, a volume resistivity may be controlled by  $1 \times 10^6 - 1 \times 10^{10}$  ohm-cm (at the time of 1kV impression), and as long as the electrical-potential-difference dependency of resistance is remarkable and is not large, other things may be used. What is necessary is for EPDM, polyurethane rubber, CR, etc. just to be able to distribute an electric conduction agent suitable in it as the quality of the material mentioned to others.

[0093] Next, although it is the imprint belt 6, the outer-diameter dimension is  $\phi 80$ mm and a tube configuration with a width of face of 300mm, thickness is 100 micrometers and a volume resistivity is 108 - 1015 ohm-cm (at the time of 1kV impression). A silicon denaturation poly carbo is made to distribute carbon with the gestalt of this operation, and they are volume-resistivity 1011 ohm-cm, and surface electrical resistance 1012 - 1013 ohm-cm<sup>2</sup>. The controlled resin conveyor belt was used.

[0094] As other materials usable as an imprint belt 6, by the resin system A polycarbonate (PC), nylon (PA), polyester (PET), Polyethylenenaphthalate (PEN), Pori Sall John (PSU), A polyether ape phon (PEI), polyether imide (PEI), Polyether nitril (PEN), a polyether ether ketone (PEEK), Thermoplastic polyimide (TPI), thermosetting polyimide (PI), a PES alloy, There are polyvinylidene fluoride (PVdF), an ethylene tetrafluoroethylene copolymer (ETFE), etc. by the elastomer system Polyolefine system thermoplastic elastomer, thermoplastic elastomer polyester, Polyurethane system thermoplastic elastomer, a polyurethane system thermosetting elastomer, Polystyrene system thermoplastic elastomer, thermoplastic elastomer polyamide, Thermoplastic elastomer fluorine, poly-butadiene system thermoplastic elastomer, polyethylene system thermoplastic elastomer, ethylene vinyl acetate system thermoplastic elastomer, polyvinyl chloride system thermoplastic elastomer, etc. are mentioned.

[0095] As conditions for other, it is the contact pressure to the middle imprint object 5 of the contact pressure: 1kgf imprint belt 6 to the middle imprint object 5 of the contact pressure: 2kgf middle imprint object cleaning roller 8 to the photoconductor drum 1 of the middle imprint object 5. : It is 5kgf.

[0096] Further Photoconductor drum 1 top dark potential (non-image section potential by primary electrification)

:  $V_d = -550V$  Photoconductor drum 1 top \*\*\*\*\* (image section potential by laser exposure)

:  $V_i = -150V$  The development approach : 1 component jumping development Development bias :  $V_{dc} = -400V$

$V_{ac} = 1600V_{pp}$  Frequency = 1800Hz Process speed : 120 mm/sec Primary imprint bias : +100V Front [ a secondary imprint ] electrification bias (total current supplied from the source 31 of bias)

:  $I_{dc} = -100\mu A$   $I_{ac} = 20\mu A_{rms}$  Frequency = 1000Hz It is a sinusoidal form. In addition, an above-mentioned total current shall mean the total of a current which flows to the corona wire which constitutes the electrification machine 18 before a secondary imprint, and the both sides of shielding.

[0097] On the conditions explained in full detail above, the effectiveness of middle imprint object cleaning was checked in the color picture formation equipment of a configuration of being shown in drawing 1.

[0098] The timing of bias impression carries out, before [ the electrification machine 18 before a secondary imprint ] the toner image on the middle imprint object 5 receives a secondary imprint. That is, at the time of the print of a monochrome continuation pattern, he impresses the electrification bias before a secondary imprint to a primary imprint and coincidence, and is trying to impress the electrification bias before a secondary imprint to a primary imprint and coincidence of four amorous glance at the time of 4 color multiplex imprint.

[0099] It was made for the timing of the contact to the middle imprint object 5 of the middle imprint object cleaning roller 8 to contact the middle imprint object 5 at a primary imprint and coincidence at the time of the print of monochrome continuation Bataan. This is for preventing that an image is confused with the shock of contact of middle imprint object cleaning sky 8. Moreover, he is trying to make it contact at the time of 4 color multiplex imprint at the same time the primary imprint of four amorous glance was completed.

[0100] Drawing 8 shows the secondary imprint bias dependency of the secondary transfer residual toner concentration on the middle imprint object 5 in a H/H environment (in this drawing, it is displayed as "secondary imprint \*\*\*\*\*").

Measurement of transfer residual toner concentration tapes the transfer residual toner on the middle imprint object 5, and is performed using the Macbeth concentration meter.

[0101] In drawing 8, as compared with the condition that there is no electrification before a secondary imprint, the range of secondary imprint bias where secondary imprint \*\*\*\*\* becomes [ the direction which performed electrification before a secondary imprint ] small is large, and, moreover, secondary imprint \*\*\*\*\* at that time is also low. It was made, as for the toner before the secondary imprint on the middle imprint object 5, for 0.6 mg/cm<sup>2</sup> and toner TORIBO to serve as [ the amount of toners ] -20microC/g at this time.

[0102] In order to perform middle imprint object cleaning, the direction with as much as possible few secondary transfer residual toners on the middle imprint object 5 is good. If there are many these amounts of transfer residual toners, in order to charge a transfer residual toner with the middle imprint object cleaning roller 8 and to return to a photoconductor drum 1, it is necessary to apply cleaning bias strong against the middle imprint object cleaning roller 8. If middle imprint object cleaning is carried out on the strong bias, since the toner already charged in reversed polarity (the gestalt of this operation straight polarity) in the secondary imprint among secondary transfer residual toners will be charged still more strongly, the phenomenon in which the toner which has very high positive charge is generated happens.

[0103] Drawing 9 is drawing which expressed the above-mentioned present condition typically. This phenomenon is explained using this drawing.

[0104] When TORIBO of the toner 94 on the photoconductor drum 1 before a primary imprint is -20microC/g, TORIBO immediately after a primary imprint hardly changes. This is because primary imprint bias is +100V and a low value. When primary imprint bias was made high, the rate of the toner reversed among the toners on the middle imprint object 5 after a primary imprint compared with a photoconductor drum 1 top increased, and since the phenomenon in which secondary imprint effectiveness falls as a result was checked, primary imprint bias was low set up with +100V like said primary imprint bias value.

[0105] In the condition that there is no electrification before a secondary imprint, with TORIBO 20microC/g held, the toner imprinted the 1st order on the middle imprint object 5 goes into secondary imprint processes, and is imprinted by imprint material.

[0106] The polarity of normal has [ the secondary transfer residual toner 95 on the middle imprint object 5 ] the toner of the straight polarity reversed to reversed polarity as dominant as this secondary imprint fault. TORIBO on the middle imprint object 5 at this time was +10-+20microC/g.

[0107] further -- the middle imprint object cleaning roller 8 -- bias -- impressing -- most transfer residual toners 95 -- reversed polarity -- reversal \*\*\*\* -- TORIBO of the toner 96 after middle imprint object cleaning roller 8 passage goes up to C/g by +40-+50micro by things.

[0108] Thus, since a toner is electrified [ strong ], efficiently, the secondary transfer residual toner 96 is re-imprinted to a photoconductor drum 1, and returns to it.

[0109] However, if there are many these amounts of toners or the toner charged in unusually strong straight polarity arises, as shown in drawing 9 Primary imprint nip N1 The toner 94 which is going to be imprinted by the primary middle imprint object 5 from a photoconductor drum 1 at the time of the primary imprint which can be set, About the toner 96 which is going to return from the middle imprint object 5 to a photoconductor drum 1, since the amount of electrifications of the toner 96 which is going to return is large, the toner 94 which is going to be imprinted the 1st order will be drawn and this toner 94 will be again pulled back to a photoconductor drum 1.

[0110] As an actual image, the marks of the transfer residual toner at the time of a pre-print will appear like NEGAGOSUTO in the image after the 2nd sheet of a continuation print. Hereafter, this phenomenon is called a cleaning ghost.

[0111] Therefore, in order to carry out middle imprint object cleaning of this invention, it is necessary to make the both sides of poor cleaning and a cleaning ghost not generate. These people attained by performing optimization with the bias which impresses these to imprint bias and the middle imprint object cleaning roller 8, and electrification before a secondary imprint, and raising toner TORIBO on the middle imprint object 5 before a secondary imprint more than - 20microC/g.

[0112] As secondary imprint bias, the range of the bias which takes the minimum value mostly of the curve of the secondary imprint bias dependency in drawing 8 is the optimal secondary imprint bias used in the gestalt of this operation. 10microA was used in the condition that there is specifically electrification before a secondary imprint about



4microA in the condition that there is no electrification before a secondary imprint, by the gestalt of this operation.

[0113] Drawing 16 is with the case where there is nothing with the case where there is electrification before a secondary imprint, and is the table which checked poor cleaning and a cleaning ghost's generating about the high-humidity/temperature environment (it is called the "H/H environment" the temperature of 30 degrees C, 80% of humidity RH, and the following), the ordinary-temperature normal-relative-humidity environment (it be called a "J/J environment" the temperature of 23 degrees C, 50% of humidity RH, and the following), and the low-humidity/temperature environment (it be called a "L/L environment" the temperature of 20 degrees C, 10% of humidity RH, and the following).

[0114] In drawing 16, when not performing electrification before a secondary imprint, the middle imprint object cleaning bias which poor cleaning does not generate with a cleaning ghost existed, and primary imprint coincidence cleaning is materialized [ in / both / a J/J environment and a L/L environment ]. However, in a H/H environment, a cleaning ghost occurs above 20microA, and below in 40microA, since poor cleaning occurs, primary imprint coincidence cleaning is not materialized.

[0115] On the other hand, on the other hand, when electrification before a secondary imprint is performed In a J/J environment and a L/L environment, the middle imprint object cleaning bias which neither of poor cleaning generates with a cleaning ghost exists, and it also sets by the H/H environment further. A cleaning ghost's generating could be prevented below by 30microA, and generating of poor cleaning could be prevented above 30microA, that is, primary imprint coincidence cleaning is materialized in 30microA.

[0116] It is considered to be based on the difference in the amount of toners of the secondary transfer residual toner 95 [mg/cm<sup>2</sup>] that extent which poor cleaning and a cleaning ghost generate changes with electrifications before a secondary imprint. There were few secondary transfer residual toners 95 in the more nearly optimal [ a secondary imprint / be / it compares without electrification before a secondary imprint, and / electrification before a secondary imprint ] bias so that the secondary imprint bias dependency of the secondary transfer residual toner concentration on the middle imprint object in a H/H environment shown in drawing 8 might see. Even if it makes a middle imprint object cleaning current high, when there is no electrification before a secondary imprint by this, it is thought that generating of poor cleaning was not able to be prevented without no secondary transfer residual toners 95 being unrecoverable to a photoconductor drum 1.

[0117] Since primary imprint coincidence middle imprint object cleaning is possible and it is not necessary as the above effectiveness to go into the step which cleans the middle imprint object 5 top whenever it prints out one sheet when carrying out a continuation print with color picture formation equipments, such as a color copying machine and a color laser beam printer, improvement in the throughput at the time of a continuation print is realizable.

[0118] Moreover, also in a H/H environment, primary imprint coincidence cleaning is materialized by performing electrification before a secondary imprint.

[0119] Since doing a mechanical damage to the parts to be used is furthermore lost compared with blade cleaning, fur brush cleaning, etc., it can be equal also to long-term use enough, and the stable middle imprint object cleaning means can be offered.

[0120] With the gestalt of this operation, although the outer-diameter phi20mm middle imprint object cleaning roller 8 was used, when it was the roller whose outer diameter is about phi12-30mm according to examination of these people, achieving the almost same function was checked.

[0121] Furthermore, although the cylinder-like photoconductor drum 1 and the middle imprint object 5 were used with the gestalt of this operation, it cannot be overemphasized that the same effectiveness is acquired satisfactory at all also with belt-like a photo conductor and a middle imprint object.

[0122] Moreover, as secondary imprint means, although the belt imprint method was used, even if it uses the conventional corona transfer and an imprint mechanical control by roller, there is instead of [ no ] in the effectiveness of this invention.

<Gestalt 2 of operation> In the gestalt 2 of operation of this invention, two kinds of toners are used as a developer.

[0123] The shape factor SF 1 uses the diameter polymerization toner of a nonmagnetic 1 component particle which is the substantial globular form about 116 and whose mean particle diameter with which the shape factor SF 2 was manufactured by the suspension-polymerization method of about 109 are 7 micrometers as yellow, a Magenta, and a cyanogen developer, including the low softening temperature matter five to 30% of the weight.

[0124] And as a black developer, it carries out 100 section internal [ of the magnetic substance, such as magnetite ] to a

styrene butyl acrylate-maleic-acid butyl half ester copolymer binder. After manufacturing by the grinding method, by conglomeration processing the mechanical shock force and in a heat style and a high temperature liquid It is the magnetic toner with a mean particle diameter of 7 micrometers of a real globular form which set the shape factor SF 1 to about 145, and set the shape factor SF 2 to about 130, and the toner which **\*\***(ed) further the silica which performed oil processing as an external additive outside is used.

[0125] Also in the gestalt 2 of this operation, the color picture formation equipment shown in drawing 1 is used. However, about the actuation, with the gestalt 2 of this operation, since two sorts of toners are used, it differs from the case of the gestalt 1 of operation somewhat. Hereafter, the same part omits explanation suitably and explains focusing on a different part.

[0126] The imprint belt 6 is being used for the color picture formation equipment of the electrophotography method shown in drawing 1 for the elastic roller of low **\*\*** [ inside ] as a secondary contact imprint means as a middle imprint object 5 again.

[0127] The electrophotography photo conductor (photoconductor drum) 1 as 1st image support A rotation drive is carried out by the non-illustrated driving means with a predetermined peripheral velocity (process speed) in the arrow-head R1 direction. In the rotation process After electrification processing is uniformly carried out to a predetermined polarity and predetermined potential with the primary electrification roller 2, the electrostatic latent image corresponding to the 1st color component image of the target color picture is formed by receiving the image exposure 3 by the image exposure means (un-illustrating).

[0128] Subsequently, the electrostatic latent image is developed with the black toner BK charged in an electrostatic latent image and reversed polarity with the 4th development counter 44 of black. The development counter 41 of four developers, i.e., the 1st development counter of yellow, the 2nd development counter 42 of a Magenta, the 3rd development counter 43 of cyanogen, and the 4th development counter 44 are carried in the body of revolution 45 by which a rotation drive is carried out by the rotation means (un-illustrating), and when this body of revolution 45 rotates in the arrow-head R4 direction, each development counters 41, 42, 43, and 4 are arranged in a photoconductor drum 1 and the development location which counters.

[0129] The rotation drive of the middle imprint object 5 is carried out with the peripheral velocity same in arrow-head R5 direction as a photoconductor drum 1. Namely, primary imprint nip N1 formed among both because the middle imprint object 5 contacts a photoconductor drum 1 It sets and moves in this direction at this rate mutually in photoconductor drum 1 front face and middle imprint object 5 front face.

[0130] As for the black toner BK which is a magnetic 1 component particle toner, toner TORIBO serves as - 10microC/g about on the photoconductor drum 1 after development. The black toner image of the 1st above-mentioned color by which formation support was carried out on photoconductor drum 1 front face is the primary imprint nip N1 between a photoconductor drum 1 and the middle imprint object 5. The 1st order is imprinted on middle imprint object 5 front face by the electric field and the pressure which are formed in the process to pass of the primary imprint bias impressed to the middle imprint object 5 by the source 29 of primary imprint bias.

[0131] The black toner image imprinted by the 1st order of this middle imprint object 5 front face receives electrification with the electrostatic latent image of a photoconductor drum 1 still stronger against reversed polarity for toner TORIBO with the electrification vessel 18 before a secondary imprint, in order [ of the yellow toner Y, the Magenta toner M, and the cyanogen toner C ] to keep step with -20microC/g about, and it comes to have TORIBO of -20microC/g about.

[0132] the electrification bias before a secondary imprint (total current supplied from the source 31 of bias) supplied to the electrification machine 18 before a secondary imprint at this time --  $I_{dc} = -100\text{microA}$ ,  $I_{ac} = 20\text{microArms}$ , frequency = 1000Hz, and a sinusoidal form -- it comes out.

[0133] Hereafter, although the superposition imprint of a yellow toner image, a Magenta toner image, and the cyanogen toner image is similarly carried out on the middle imprint object 5 one by one, electrification with the electrification machine 18 before a secondary imprint is not received. The superposition imprint of the toner image of four colors is carried out one by one by these on the middle imprint object 5, and the synthetic color toner image corresponding to the target color picture is formed. The secondary synthetic color toner image by which the superposition imprint was carried out on the middle imprint object 5 is imprinted to the imprint material P. The imprint material P which received the toner image imprint is introduced to a fixing assembly 15, and heating pressurization is carried out here and it is fixed to it. After image imprint ending to the imprint material P, the middle imprint object cleaning roller 8 is



contacted, and the transfer residual toner on the middle imprint object 5 is cleaned.

[0134] The secondary imprint bias dependency of secondary transfer residual toner concentration is shown about each secondary real monochrome imprint of a globular form nonmagnetic polymerization toner and the magnetic toner of a real globular form used with the gestalt of this operation in the condition that there is no electrification before a secondary imprint in drawing 10 in a J/J environment, and the real four secondary color imprint of a total of four classification by color of nonmagnetic polymerization toner 3 globular form classification by color and magnetic toner 1 classification by color of a real globular form.

[0135] Furthermore, each secondary real monochrome imprint of a globular form nonmagnetic polymerization toner and the magnetic toner of a real globular form used with the gestalt [ condition / of having performed electrification before a secondary imprint to drawing 11 to the real globular form magnetism toner in the J/J environment ] of this operation, About the real four secondary color imprint of a total of four classification by color of nonmagnetic polymerization toner 3 globular form classification by color and magnetic toner 1 classification by color of a real globular form, the secondary imprint bias dependency of secondary transfer residual toner concentration is shown.

[0136] In drawing 10 and drawing 11 , it turns out that the secondary imprint bias value secondary imprint \*\*\*\*\* of the magnetic toner monochrome of a real globular form indicates the minimum value to be has shifted to 10microA from 4microA by carrying out electrification before a secondary imprint. Moreover, in the secondary real monochrome imprint of a globular form nonmagnetic polymerization toner, it was 8microA, and, in the four secondary color imprint, was 12microA.

[0137] At this time, the toner before the secondary imprint on the middle imprint object 5 In the globular form secondary real monochrome imprint of a nonmagnetic polymerization toner When the amount of toners is the secondary monochrome imprint of the magnetic toner of a -20microC/g and a real globular form, [ TORIBO / 0.6 mg/cm<sup>2</sup> and / toner ] When toner TORIBO in the condition that C/g and electrification before secondary have -10micro of toner TORIBO in the condition that 0.7 mg/cm<sup>2</sup> and electrification before secondary do not have the amount of toners was -20microC/g and 4 color multiplex imprint, the amount of toners was [ 1.4mg /of 2 and toner TORIBO / cm ] -18microC/g.

[0138] From drawing 10 and drawing 11 , secondary imprint bias was taken as 12microA which is the optimal secondary imprint bias of each four secondary color imprint, also when there was electrification before a secondary imprint, and also when there was nothing.

[0139] Drawing 17 is the table which checked generating of the poor cleaning in a J/J environment and the cleaning ghost when changing the bias value impressed to the middle imprint object cleaning roller 8 at the time of 4 color multiplex imprint in case there is nothing with the case where there is electrification before a secondary imprint.

[0140] In drawing 17 , when there is no electrification before a secondary imprint, poor cleaning occurs [ middle imprint object cleaning bias ] in 0-30microA, a cleaning ghost's generating is checked above 40microA, and primary imprint coincidence cleaning is not materialized. On the other hand, when there is electrification before a secondary imprint, since cleaning becomes poor at 0-10microA and a cleaning ghost occurs above 50microA, primary imprint coincidence cleaning will be materialized by middle imprint cleaning bias in 20-40microA.

[0141] The poor cleaning which it has generated when there is no electrification before a secondary imprint is produced in the monochrome of the magnetic toner of a real globular form. As for this, if a secondary imprint is performed on the optimal secondary imprint bias at the time of 4 color multiplex imprint since the optimal secondary imprint bias in the secondary monochrome imprint of the magnetic toner of a real globular form is lower than others as shown in drawing 10 , the secondary transfer residual toner of the magnetic toner of a real globular form will increase extremely. It is thought that poor cleaning occurs in the monochrome of the magnetic toner of a real globular form by this.

[0142] When there is electrification before a secondary imprint, on the other hand, according to the effectiveness of electrification before a secondary imprint Since the secondary imprint bias with each optimal secondary imprint effectiveness in a real secondary globular form nonmagnetic polymerization toner monochrome, magnetic toner monochrome [ of a real globular form ], and 4 color imprint is approaching compared with the case where there is no electrification before a secondary imprint A secondary transfer residual toner decreases, generating of poor cleaning is controlled, and primary imprint coincidence cleaning is materialized.

<Gestalt 3 of operation> Two kinds of toners are used for the gestalt 3 of operation of this invention as a developer like the gestalt 2 of above-mentioned operation.

[0143] The shape factor SF 1 uses the diameter polymerization toner of a nonmagnetic 1 component particle which is

the substantial globular form about 116 and whose mean particle diameter with which the shape factor SF 2 was manufactured by the suspension-polymerization method of about 109 are 7 micrometers as yellow, a Magenta, and a cyanogen developer, including the low softening temperature matter five to 30% of the weight.

[0144] And as a black developer, it carries out 100 section internal [ of the magnetic substance, such as magnetite ] to a styrene-butyl acrylate-maleic-acid BUCHIRUHA-Fez Tell copolymer binder. After manufacturing by the grinding method, by conglomeration processing the mechanical shock force and in a heat style and a high temperature liquid It is the magnetic toner with a mean particle diameter of 7 micrometers of a real globular form which set the shape factor SF 1 to about 145, and set the shape factor SF 2 to about 130, and the toner which **\*(ed)** the silica which performed oil processing as an external additive outside is used.

[0145] Drawing 12 is the outline sectional view of the color picture formation equipment of the electrophotography method in the gestalt of this operation. The imprint belt 6 is used for the elastic roller of low **\*\*** [ inside ] as a secondary contact imprint means as a middle imprint object 5 again.

[0146] The electrophotography photo conductor (photoconductor drum) 1 as 1st image support has a predetermined peripheral velocity (process speed) in the arrow-head R1 direction, and a rotation drive is carried out by the driving means (un-illustrating). A photoconductor drum 1 is a rotation process, and after electrification processing is uniformly carried out to a predetermined polarity and predetermined potential with the primary electrification roller 2, the electrostatic latent image corresponding to the 1st color component image of the target color picture is formed by receiving the image exposure 3 by the image exposure means (un-illustrating).

[0147] Subsequently, the electrostatic latent image is developed with the yellow toner Y which is the 1st color charged in an electrostatic latent image and reversed polarity with the 1st development counter 41 of yellow. The 1st development counter 41, the 2nd development counter 42 of a Magenta, the 3rd development counter 43 of cyanogen, and the 4th development counter 44 of black are carried in the pivotable body of revolution 45, and a predetermined development counter is arranged in a photoconductor drum 1 and the development location which counters by carrying out the rotation drive of this body of revolution 45 in the arrow-head R4 direction by the driving gear (un-illustrating).

[0148] The rotation drive of the middle imprint object 5 is carried out with the peripheral velocity same in arrow-head R5 direction as a photoconductor drum 1.

[0149] For the yellow toner Y which is a diameter polymerization toner of a nonmagnetic 1 component particle, toner TORIBO is [ about ] on the photoconductor drum 1 after development. -20micro is C/g.

[0150] The yellow toner image of the 1st above-mentioned color by which formation support was carried out on the photoconductor drum 1 is the primary imprint nip N1 between a photoconductor drum 1 and the middle imprint object 5. The 1st order is imprinted on middle imprint object 5 front face by the electric field and the pressure which are formed in the process to pass of the primary imprint bias impressed to the middle imprint object 5 by the source 29 of primary imprint bias.

[0151] At this time, bias is not supplied to the electrification machine 19 before a primary imprint (charge grant means) by which opposite arrangement was carried out from the source 32 of bias at a photoconductor drum 1, but it is un-operating.

[0152] Hereafter, the superposition imprint of the Magenta toner image of the 2nd color and the cyanogen toner image of the 3rd color is similarly carried out on the middle imprint object 5 one by one.

[0153] Toner TORIBO of the black toner BK of the 4th amorous glance which is the diameter toner of a magnetic 1 component particle by which formation support was carried out on the photoconductor drum 1 is -10microC/g about on the photoconductor drum 1 after development.

[0154] In order to arrange toner TORIBO of the black toner BK which is this magnetic toner with the toner TORIBO value of the yellow toner Y which is a diameter polymerization toner of a nonmagnetic 1 component particle, the Magenta toner M, and the cyanogen toner C, The black toner BK on a photoconductor drum 1 about the hand of cut of a photoconductor drum 1 It is the downstream of a development location and is the primary imprint nip N1. With the electrification vessels 19 before a primary imprint for giving a charge to the developer on a photoconductor drum 1 (corotron, scorotron, etc.) arranged at the upstream By receiving electrification with the electrostatic latent image of a photoconductor drum 1 still stronger against reversed polarity, it comes to have toner TORIBO of -20microC/g about.

[0155] the electrification bias before a primary imprint (total current supplied from the source 32 of bias) supplied to the electrification machine 19 before a primary imprint at this time --  $I_{dc} = -50\text{microA}$ ,  $I_{ac} = 10\text{microArms}$ , frequency = 1000Hz, and a sinusoidal form -- it comes out.

[0156] And a black toner image is the primary imprint nip N1 between a photoconductor drum 1 and the middle imprint object 5. The 1st order is imprinted on middle imprint object 5 front face by the electric field and the pressure which are formed in the process to pass of the primary imprint bias impressed to the middle imprint object 5 by the source 29 of primary imprint bias.

[0157] The superposition imprint of the toner image from the 1st amorous glance to the 4th amorous glance is carried out one by one by these on the middle imprint object 5, and the synthetic color toner image corresponding to the target color picture is formed. The secondary synthetic color toner image by which the superposition imprint was carried out on the middle imprint object 5 is imprinted to the imprint material P. The imprint material P which received the toner image imprint is introduced to a fixing assembly 15, and heating pressurization is carried out here and it is fixed to it. After image imprint ending to the imprint material P, the middle imprint object cleaning roller 8 is contacted, and the transfer residual toner on the middle imprint object 5 is cleaned.

[0158] Like the gestalt 2 of the above-mentioned operation, toner TORIBO of the toner of four colors on the middle imprint object 5 Electrification before a primary imprint does not twist it as a toner species, but all are about arranged with  $-20\mu\text{C/g}$ . According to the effectiveness of electrification before this primary imprint Since the secondary imprint bias with each optimal secondary imprint effectiveness in a real secondary globular form nonmagnetic polymerization toner monochrome, \*\*\*\*\* NA monochrome [ of a real globular form ], and 4 color imprint is approaching compared with the case where there is no electrification before a primary imprint A secondary transfer residual toner decreases, generating of poor cleaning is controlled, and primary imprint coincidence cleaning is materialized.

[0159] However, although a charge cannot be given to the toner of arbitration by the approach of giving a charge to the toner after development with the electrification vessel 18 before a secondary imprint like the gestalt 2 of the above-mentioned operation, a charge can be given to the toner of arbitration by the approach of giving a charge to the toner after development with the electrification vessel 19 before a primary imprint like the gestalt 3 of this operation.

<Gestalt 4 of operation> With the gestalt 4 of operation of this invention, electrification of the toner on the middle imprint object 5 with the electrification machine 18 before a secondary imprint and middle imprint object cleaning perform toner cleaning on the middle imprint object 5 at the time of the Maeta rotation and recovery after jam processing.

[0160] It is necessary to clean the toner on the middle imprint object 5 at the time of recovery after the Maeta rotation or jam processing. However, it is not known what kind of TORIBO the toner on the middle imprint object 5 at this time has. When many toners which hardly have TORIBO especially exist, the toner which does not have TORIBO on the middle imprint object 5 will remain only by the bias impression to the middle imprint object 5, without the ability fully cleaning. In order to clean this toner electrostatic, there is the need of giving TORIBO to these toners. As a TORIBO grant means for that, the electrification machine 18 before a secondary imprint is used.

[0161] The sequence at the time of the Maeta rotation in the gestalt of this operation and recovery after jam processing is raised to drawing 13. This sequence is explained to below. In addition, what is shown in drawing 1 is used for color picture formation equipment.

[0162] First, a photoconductor drum 1 and the middle imprint object 5 are rotated, and a sensor (un-illustrating) detects the home position of the middle imprint object 5.

[0163] The middle imprint object 5 gives TORIBO of about 1-round part (1st round) minus of the middle imprint object 5 to the toner on the middle imprint object 5 with the electrification vessel 18 before a secondary imprint, with rotation continued. the total current supplied to the electrification machine 18 before a secondary imprint from the source 31 of bias at this time --  $I_{dc} = -100\mu\text{A}$ ,  $I_{ac} = 20\mu\text{Arms}$ , frequency = 1000Hz, and a sinusoidal form -- it comes out.

[0164] In order to collect the toners charged in the minus on the middle imprint object 5 to a photoconductor drum 1, -1.5kV bias is impressed to the middle imprint object 5. At this time, the primary surface potential of a photoconductor drum 1 is charged in -550V. This actuation is performed by 2 round of the middle imprint object 5 (the 2nd round, the 3rd round).

[0165] Since the toner which remains on the middle imprint object 5 further in this phase is only a toner which has TORIBO of plus, it cleans after that the middle imprint object 5 by the middle imprint object cleaning roller 8 which was stated with the gestalt 1 of operation, and the gestalt 2 of operation by 2 round of a middle imprint object (the 4th round, the 5th round).

[0166] The middle imprint object cleaning roller 8 is made to contact the middle imprint object 5, and the toner on the middle imprint object 5 is electrified in plus by impressing +50microA to cleaning bias. The toners which received electrification in this plus are collected by the surface potential of the photoconductor drum 1 which has received the middle imprint object 5 with which bias impression of +100V is carried out, and primary electrification at a photoconductor drum 1.

[0167] The toner which remained on the middle imprint object 5 by this is removed, and cleaning of the middle imprint object 5 in recovery after the Maeta rotation or jam processing is ended.

[0168] The toner in the condition of having been left for 12 hours after the 1st order was imprinted on the middle imprint object 5 by drawing 14 When a photoconductor drum 1 is made to collect by 5 impressing -1.5kV of middle imprint objects The amount of toners of the transfer residual toner on the middle imprint object 5 in the case where it does not consider as the case where my NASUHE electrification of the toner on the middle imprint object 5 is carried out with the electrification vessel 18 before a secondary imprint [mg/cm<sup>2</sup>], and the behavior of TORIBO [ $\mu\text{C/g}$ ] are mentioned. the amount of toners on the middle imprint object 5 after the primary imprint at this time -- 1.4mg/cm<sup>2</sup> it was .

[0169] The amount of toners which remains on the middle imprint object 5 because the toners collected by the photoconductor drum 1 increase in number by a transfer residual toner being charged by electrification before a secondary imprint so that drawing 14 may see becomes less, and since TORIBO of the toner which remains on the middle imprint object 5 further carries out PURASUHE reversal more greatly, it can also prevent the dirt of a middle imprint object cleaning roller 8 at the time of removal of the transfer residual toner by middle imprint object clean GURORA 8 following this.

[0170] It is not known what kind of TORIBO the toner which remains on the middle imprint object 5 at the time of the Maeta rotation and recovery after jam processing has. Therefore, in advance of cleaning by the middle imprint object cleaning roller 8, the transfer residual toner on the middle imprint object 5 can be effectively cleaned by giving the charge of minus to a transfer residual toner with the electrification vessel 18 before a secondary imprint.

<Gestalt 5 of operation> With the gestalt 5 of operation of this invention, electrification of the toner on the middle imprint object 5 with the electrification machine 18 before a secondary imprint performs toner cleaning on a middle imprint object, without cleaning the transfer residual toner on the middle imprint object 5 by the middle imprint object cleaning roller 8 at the time of the Maeta rotation and recovery after jam processing.

[0171] It is necessary to clean the toner on the middle imprint object 5 at the time of the Maeta rotation and recovery after jam processing. However, it is not known what kind of TORIBO the toner on the middle imprint object 5 at this time has. When many toners which hardly have TORIBO especially exist, the toner which does not have TORIBO on the middle imprint object 5 will remain only by the bias impression to the middle imprint object 5, without the ability fully cleaning. In order to clean this toner, there is the need of giving TORIBO to these toners. As a TORIBO grant means for that, the electrification machine 18 before a secondary imprint is used.

[0172] Furthermore, it is using together electrification before a secondary imprint, and middle imprint object cleaning in the gestalt 4 of the above-mentioned operation, and toner cleaning on the middle imprint object 5 was performed. However, in the gestalt of this operation, it is using the electrification machine 18 before a secondary imprint also as a plus electrification means of TONAHE on the middle imprint object 5, and toner cleaning on the middle imprint object 5 is performed, without performing middle imprint object cleaning.

[0173] The sequence at the time of the Maeta rotation in the gestalt of this operation and recovery after jam processing is raised to drawing 15 . This sequence is explained to below.

[0174] First, the middle imprint object 5 is rotated and a sensor (un-illustrating) detects the home position of the middle imprint object 5.

[0175] The middle imprint object 5 gives TORIBO of about 1-round part (1st round) minus of the middle imprint object 5 to the toner on the middle imprint object 5 with the electrification vessel 18 before a secondary imprint, with rotation continued. the total current supplied to the electrification machine 18 before a secondary imprint from the source 31 of bias at this time --  $I_{dc} = -100\mu\text{A}$ ,  $I_{ac} = 20\mu\text{A}$ , frequency = 1000Hz, and a sinusoidal form -- it comes out.

[0176] In order to collect the toners charged in the minus on the middle imprint object 5 to a photoconductor drum 1, -1.5kV bias is impressed to the middle imprint object 5. This actuation is performed by 2 round of the middle imprint object 5 (the 2nd round, the 3rd round).

[0177] Although most toners which remain on the middle imprint object 5 further in this phase are toners which have TORIBO of plus, it is impressing the bias of the total current of  $I_{dc}=+100\mu A$ ,  $I_{ac}=20\mu A$ , frequency  $=1000\text{Hz}$ , and sinusoidal form \*\* from the source 30 of bias to the electrification machine 18 before a secondary imprint further, and arranges toner TORIBO on the middle imprint object 5 with strong plus. The toners which received electrification in this plus are collected by +100V at a photoconductor drum 1 by the surface potential of the middle imprint object 5 by which bias impression is carried out, and the photoconductor drum 1 which has received primary electrification. This process is performed by 2 round of the middle imprint object 5 of the middle imprint object 5 (the 3rd round, the 4th round).

[0178] Thereby, by not using the middle imprint object cleaning roller 8 for cleaning of the middle imprint object 5 at the time of the Maeta rotation and recovery after jam processing, though the dirt of the middle imprint object cleaning roller 8 is avoided, the toner which remained on the middle imprint object 5 is removable.

[0179] In the gestalt of the above operation, an electrostatic recording dielectric, the magnetic-recording magnetic substance, etc. can be used other than the above-mentioned photoconductor drum (electrophotography photoconductor) 1 as 1st image support. Moreover, also about the configuration, you may be the thing of not only the thing of an above-mentioned drum type but the shape for example, of a belt.

[0180] Moreover, also about the 2nd image support, it can replace with the thing of an above-mentioned drum type, and a belt-like middle imprint object can be used.

[0181] Furthermore, in the gestalt of the above operation, although the case where each performs development of the electrostatic latent image on a photoconductor drum 1 by reversal development by the developer 4 is explained, this invention of it being applicable also about the case where not only reversal development but normal development is performed is natural. Also in this case, that fundamental configuration can be diverted as it is.

[0182]

[Effect of the Invention] As explained above, according to this invention, in primary imprint nip, this secondary transfer residual toner can be moved to the 1st image support front face from the 2nd image support front face by electrifying the secondary transfer residual toner of the 2nd image support front face in the 1st surface potential and reversed polarity of image support with an electrification means. At this time, coincidence can imprint the toner image of the 1st image support front face on the 2nd image support front face through the same primary imprint nip. That is, the 2nd image support front face's imprinting the primary toner image from the 1st image support front face and coincidence can be made to be able to move a secondary transfer residual toner to the 1st image support front face from the 2nd image support front face on the contrary through primary imprint nip, and 2nd image support can be cleaned. It can clean without moreover this causing the fall of a throughput with an easy configuration.

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[Translation done.]

**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] Drawing of longitudinal section showing the outline configuration of the color picture formation equipment of the gestalt 1 of operation.

[Drawing 2] Drawing of longitudinal section showing the outline configuration of the middle imprint object cleaning roller in the gestalt 1 of operation.

[Drawing 3] Drawing of longitudinal section showing the outline configuration of the measuring instrument for measuring real use resistance of the middle imprint object cleaning roller used by this invention, and a middle imprint object.

[Drawing 4] Drawing of longitudinal section showing the outline configuration of the middle imprint object in the gestalt 1 of operation.

[Drawing 5] The sectional view showing the outline configuration of the polymerization toner used by this invention

[Drawing 6] Drawing explaining how to ask for a shape factor SF 1.

[Drawing 7] Drawing explaining how to ask for a shape factor SF 2.

[Drawing 8] Drawing showing the difference in the relation of the secondary imprint bias and secondary transfer residual toner concentration by the existence of electrification before a secondary imprint under the H/H environment in the gestalt 1 of operation.

[Drawing 9] Drawing explaining the generating mechanism of cleaning NEGAGOSUTO.

[Drawing 10] Drawing showing the secondary imprint bias dependency of secondary transfer residual toner concentration in the condition that there is no electrification before a primary imprint, in the gestalt 2 of operation about a secondary real monochrome imprint and a real four secondary color imprint of nonmagnetic polymerization toner 3 globular form classification by color and a total of four classification by color of magnetic toner 1 classification by color of a real globular form of a globular form nonmagnetic polymerization toner and the magnetic toner of a real globular form.

[Drawing 11] Drawing showing the secondary imprint bias dependency of secondary transfer residual toner concentration in the condition that there is electrification before a primary imprint, in the gestalt 2 of operation about a secondary real monochrome imprint and a real four secondary color imprint of nonmagnetic polymerization toner 3 globular form classification by color and a total of four classification by color of magnetic toner 1 classification by color of a real globular form of a globular form nonmagnetic polymerization toner and the magnetic toner of a real globular form.

[Drawing 12] Drawing of longitudinal section showing the outline configuration of the color picture formation equipment of the gestalt 3 of operation.

[Drawing 13] Drawing showing the sequence at the time of the Maeta rotation in the gestalt 4 of operation, and recovery after jam processing.

[Drawing 14] Drawing showing the amount of toners of the transfer residual toner on a middle imprint object in the case where my NASUHE electrification according the transfer residual toner on a middle imprint object to the electrification machine before a secondary imprint is performed at the time of the Maeta rotation and recovery after jam processing, and the case where it does not carry out, and change of TORIBO.

[Drawing 15] Drawing showing the sequence at the time of the Maeta rotation in the gestalt 5 of operation, and recovery after jam processing.

[Drawing 16] Drawing which checked poor cleaning and a cleaning ghost's generating about the H/H environment, the J/J environment, and the L/L environment by the case where there is nothing with the case where there is electrification before a secondary imprint, in the gestalt 1 of operation.

[Drawing 17] Drawing which checked the poor cleaning at the time of 4 color multiplex imprint in case there is nothing with the case where there is electrification before a secondary imprint, in the gestalt 2 of operation, and a cleaning ghost's generating about the bottom of a J/J environment.

[Description of Notations]

1 1st Image Support (Electrophotography Photo Conductor, Photoconductor Drum)

2 Electrification Roller

3 Laser Beam

4 Developer

5 2nd Image Support (Middle Imprint Object)

6 Secondary Imprint Member (Imprint Belt)

8 Electrification Means (Middle Imprint Object Cleaning Roller)

9 Toner

18 Charge Grant Means (Front [ Secondary Imprint ] Electrification Machine)

19 Charge Grant Means (Front [ Primary Imprint ] Electrification Machine)

41, 42, 43, 44 development counters

P 3rd image support (imprint material)

N1 Primary imprint nip

N2 Secondary imprint nip (secondary imprint location)

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[Translation done.]

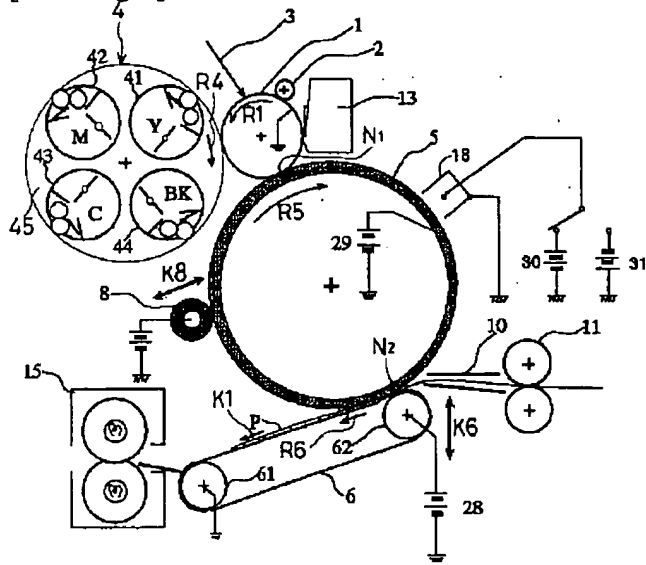
\* NOTICES \*

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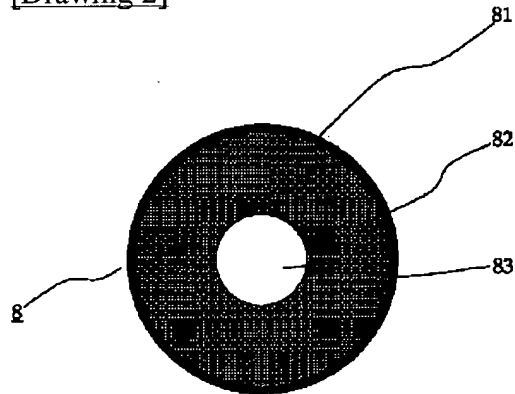
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DRAWINGS

[Drawing 1]

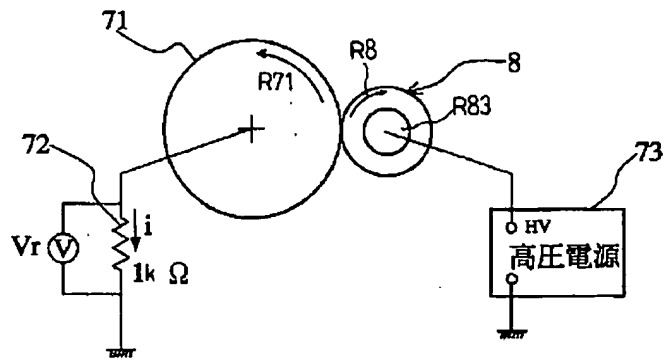


[Drawing 2]

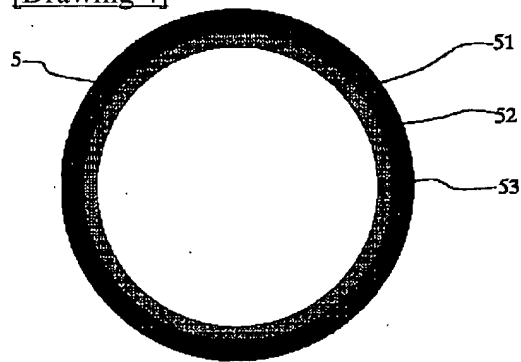


[Drawing 3]

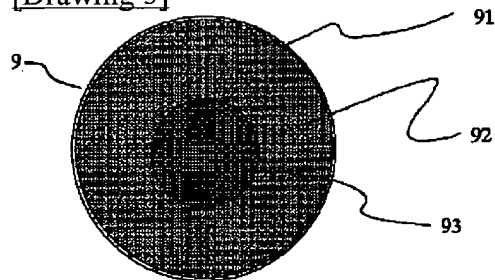




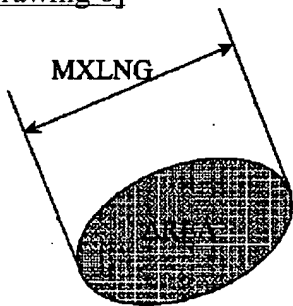
[Drawing 4]



[Drawing 5]



[Drawing 6]



$$SF1 = \frac{(MXLNG)^2}{AREA} \times \frac{\pi}{4} \times 100$$

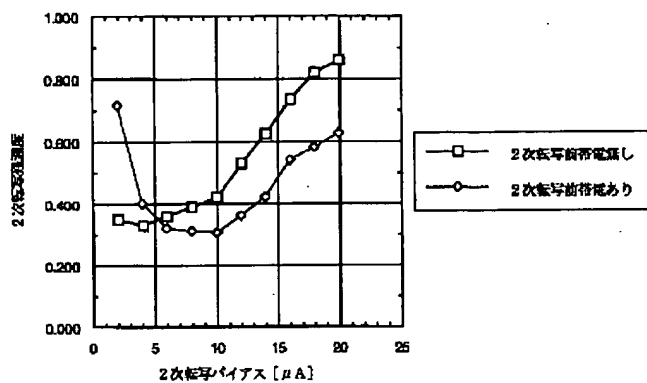
[Drawing 7]



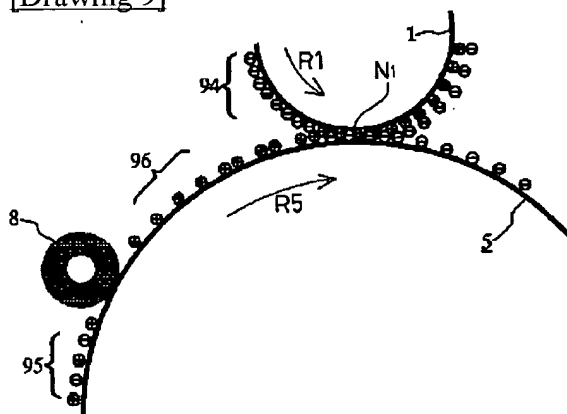
$$SF2 = \frac{(PERI)^2}{AREA} \times \frac{\pi}{4} \times 100$$

[Drawing 8]

H/H環境

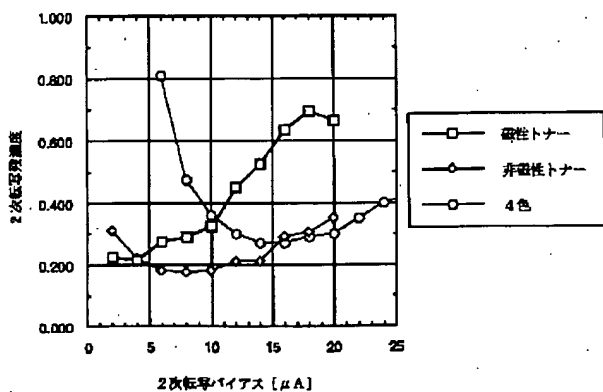


[Drawing 9]



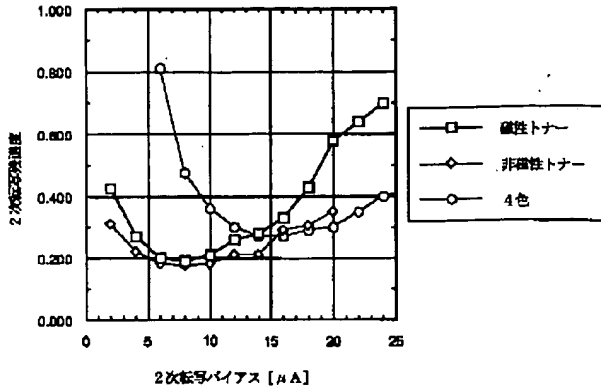
[Drawing 10]

2次転写前帯電無し

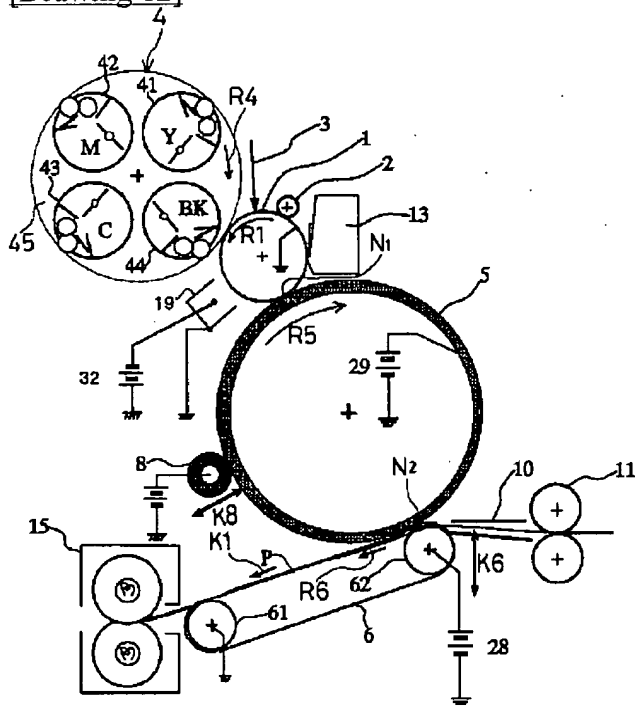


[Drawing 11]

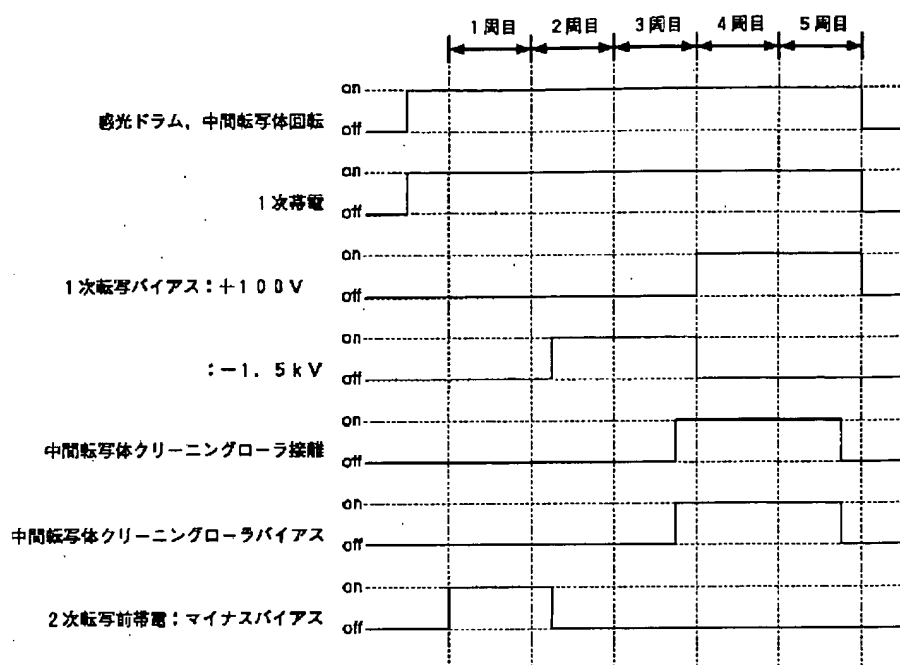
2次転写前帯電あり



[Drawing 12]

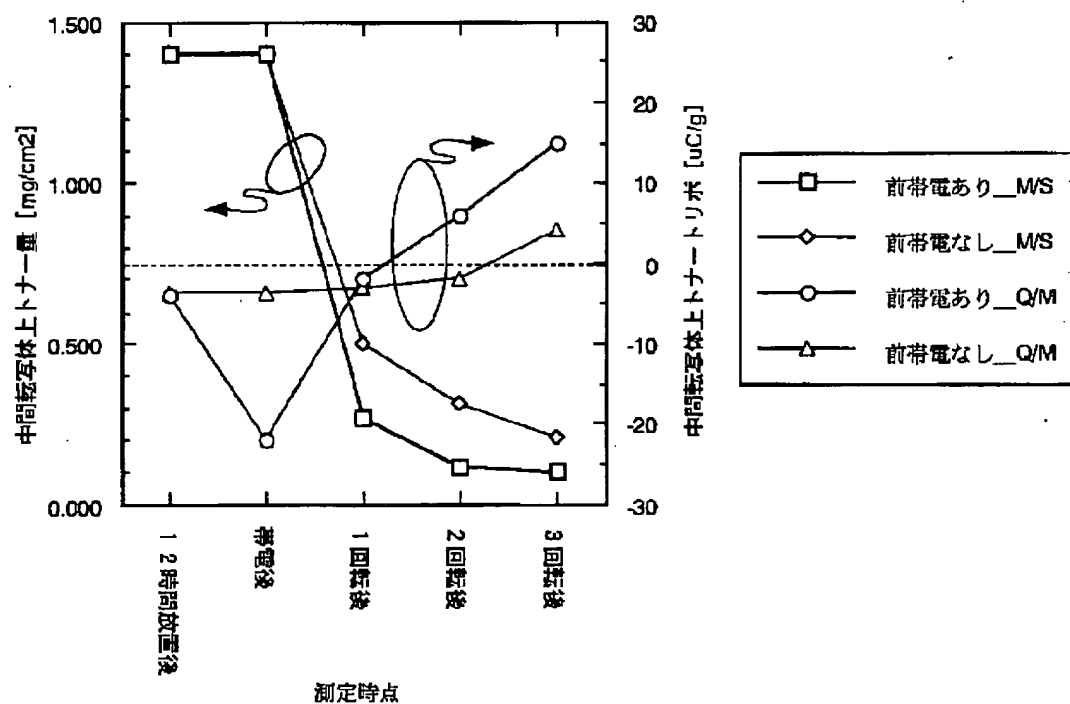


[Drawing 13]

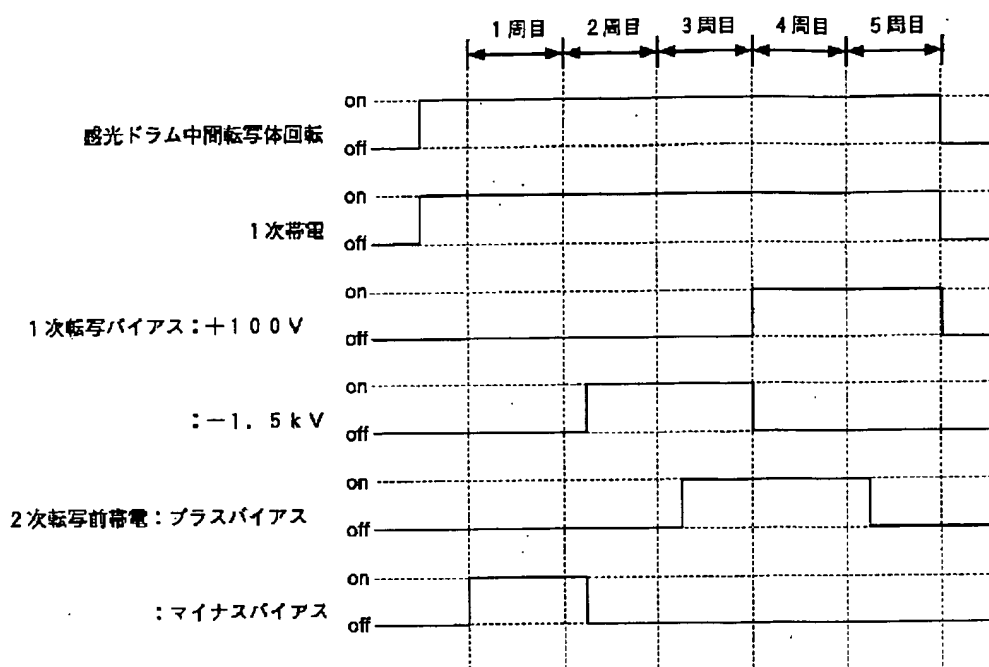


[Drawing 14]

中間転写体上残留トナーの  
クリーニングにおける帯電の効果



[Drawing 15]



[Drawing 16]

2次転写前帯電の有無による中間転写体クリーニングの環境依存性

2次転写前帯電	2次転写前帯電無し						2次転写前帯電あり					
	H/H環境		J/J環境		L/L環境		H/H環境		J/J環境		L/L環境	
印加バイアス	クリーニング 不足	クリーニング ゴースト	クリーニング 不足	クリーニング ゴースト	クリーニング 不足	クリーニング ゴースト	クリーニング 不足	クリーニング ゴースト	クリーニング 不足	クリーニング ゴースト	クリーニング 不足	クリーニング ゴースト
0 $\mu$ A	×	○	×	○	×	○	×	○	×	○	×	○
5 $\mu$ A	×	○	△	○	○	○	×	○	○	○	○	○
10 $\mu$ A	×	○	○	○	○	○	×	○	○	○	○	○
20 $\mu$ A	×	△	○	○	○	△	△	○	○	○	○	○
30 $\mu$ A	×	×	○	○	○	×	○	○	○	○	○	○
40 $\mu$ A	△	×	○	△	○	×	○	△	○	○	○	○
50 $\mu$ A	○	×	○	×	○	×	○	×	○	△	○	△

[Drawing 17]

磁性トナーと非磁性トナーを用いる場合における  
2次転写前帯電のありなしによる中間転写体クリーニング特性

印加 バイ アス	2次転写 前帯電無し		2次転写 前帯電あり	
	クリーニング 不良	クリーニング ゴースト	クリーニング 不良	クリーニング ゴースト
0 $\mu$ A	×	○	×	○
5 $\mu$ A	×	○	×	○
10 $\mu$ A	×	○	△	○
20 $\mu$ A	×	○	○	○
30 $\mu$ A	×	○	○	○
40 $\mu$ A	○	△	○	○
50 $\mu$ A	○	×	○	×

[Translation done.]